

ON A COLLECTION OF LAND AND FRESHWATER SHELLS FROM
THE UPPER NILE REGION.

By CÆSAR R. BOETTGER and FRITZ HAAS.

Read 9th May, 1913.

THE land and freshwater shells here enumerated were collected in 1910 by Dr. Otto le Roi, of Bonn, during Prof. Dr. Al. Koenig's expedition to the Upper Nile region. It is quite natural that in a collection from Central Africa the species of the genus *Limicolaria* largely predominate, both as regards the number of species and specimens. The collection forms part of Dr. Koenig's museum at Bonn, but duplicates have been kindly presented by the collector to the Senckenberg Museum, and duplicates of the Pulmonates to C. R. Boettger. The Gastropods are treated by C. R. Boettger, and the Bivalves by F. Haas.

BURTOA NILOTICA (Pfr.).

There are two specimens of this form which is found especially in the lake district and near the sources of the White Nile. They were collected near Gemesa, Bahr el Djebel (March 20, 1910).

LIMICOLARIA KAMBEUL (Brug.), var. TURRIS, Pfr.

In 1860 L. Pfeiffer (Proceedings of the Zoological Society of London, 1861, p. 25, pl. ii, fig. 3) described a new species, *Limicolaria turris*, based on specimens from the source of the White Nile (leg. Petherick). The species was mentioned again by L. Pfeiffer (*Novitates conchologicæ*, Bd. ii, p. 162, pl. xlv, figs. 1-3, Cassel, 1860-6) and by E. von Martens (Malak. Blätt., 1865, p. 197). E. von Martens (Malak. Blätt., 1870, p. 33, and 1873, pp. 38-9) found *L. turris* in the collection of G. Schweinfurth from the Djur and Rek forests, south of the Meshra of the Bahr el Ghazal. E. von Martens first recognized the similarity between *L. turris* and the West African *L. Adansoni*, Pfr. The first author who united the two species was C. J. Jickeli (*Fauna der Land- und Süßwasser-Mollusken Nord-Ost-Afrika's*, Dresden, 1874, pp. 154-7, pl. ii, figs. 3, 4). A complete list of the forms of this group, of which *L. Kambeul* was first described and ought to be the typical sub-species, was given by Pilsbry (Man. Conch., ser. 11, vol. xii, pp. 251-3, Philadelphia, 1904). We now see that *L. Kambeul* is a species which ranges in the form of several varieties from Senegal to the sources of the Nile. Dr. le Roi brought home four specimens of *L. Kambeul*, var. *turris*, one from Redjaf, Bahr el Djebel (March 14, 1910), two from Kiro, Bahr el Djebel (March 17, 1910), and one from Gemesa, Bahr el Djebel (March 18, 1910).

LIMICOLARIA FLAMMATA (Caill.).

This species is the most common shell in North-East Africa, and is one of the most variable. There is a fine series in Dr. le Roi's collection: one specimen from the junction of the Bahr el Ghazal and

the Bahr el Arab (March 1, 1910), one from Bor, Bahr el Djebel, and one from Malek, Bahr el Djebel (March 8, 1910), two northward at Mongalla, Bahr el Djebel (March 17, 1910), three from Lado, Bahr el Djebel (March 11, 1910), two from Gondokoro, Bahr el Djebel (March 12, 1910), three northward from Lado, Bahr el Djebel (March 15, 1910), four from Gemesa, Bahr el Djebel (March 18, 1910), one from Kaka, Bahr el Abiad (February 20, 1910), one from Abu Doleb, Bahr el Abiad (March 30, 1910), four from Renk, Bahr el Abiad (February 19, 1910), and three from Djebel Achmed Aga, Bahr el Abiad (April 3, 1910).

LIMICOLARIA KOENIGI, n.sp.

Testa rimata, longissima, procera, corneo-albida, flammulis tenuibus castaneis ornata, maxime supra suturam; apex albus; anfractus 9, subconvexi, regulariter accrescentes, sutura plana separati; ultimus



paulum convexiusculus, fere $\frac{1}{3}$ longitudinis totius æquans; apertura alba, pictura translucente, angusta; peristoma simplex, acutum; columella alba; margo columellaris valde reflexus, cum margine

basali angulum formans. Long. 57·5, diam. 18 mm.; apertura, alt. 20·5, lat. 8·5 mm.

Hab.—Kaka, Bahr el Abiad (leg. Otto le Roi, February 20, 1910; Museum Al. Koenig).

Shell rimate, very long and slender, corneous white, ornamented with fine chestnut stripes, especially above the suture; apex white; whorls 9, very moderately convex, regularly increasing in size, separated by an almost flat suture; the last whorl somewhat convex, measuring about one-third of the length of the shell; aperture white, displaying the external striping, narrow; peristome simple, acute; the margin of the white columella widely reflexed, forming an angle with the basal margin.

This species is most nearly related to *Limicolaria longa*, Pils. (Man. Conch., ser. II, vol. xvi, p. 284, pl. xxxii, figs. 18, 19). Like that species it belongs to the group of *L. flammata* (Caill.). From *L. longa* it is distinguished by being smaller and more delicate. The unique type-specimen was collected at Kaka, Bahr el Abiad (February 27, 1910). We have named the species in honour of Professor Dr. Al. Koenig, to whose scientific energy the whole expedition was due.

LIMICOLARIA CANDIDISSIMA, Shuttl.

We have before us four specimens of this rare *Limicolaria*, which is found especially in Kordofan. There are three from the Bahr el Ghazal (February 27, March 2, and March 1, 1910, the last near the mouth of the Bahr el Arab), and one from Abu Doleb, Bahr el Abiad (March 30, 1910). Only the specimen from Abu Doleb was obtained with animal. The four shells have no markings at all. The one from Abu Doleb has a pale corneous epidermis, darker than in *L. flammata*. It is uniformly coloured, except the columella, which is dull purplish. *L. candidissima* is certainly specifically distinct from *L. flammata*, though it belongs to the same group as that shell.

LIMICOLARIA ROHLFSI, Kob.

The well-marked *Limicolaria Rohlfsi*, Kob., was described by Kobelt at the request of E. von Martens (Kobelt, *Die Genera Livinhacia, Pseudachatina, Perideris, Limicolaria, und Homorus*, in Martini und Chemnitz: Syst. Conch. Cab., 1895, p. 72, pl. xxiii, figs. 5-6; Martens, *Beschalte Weichtiere Deutsch-Ost-Afrikas*, Berlin, 1897, p. 107, pl. v, fig. 36). The type (leg. G. Rohlf's) came from the Ngadda River (north-west of the junction of the Benue and the Niger). Some more specimens were obtained by O. Neumann (February, 1894) at Mhngu, north-east side of the Victoria Nyanza, south of Ngowe Bay, and at Kavirondo, and by Stuhlmann in the grassy steppe in Vitshumbi, at the south-west end of Albert Edward Nyanza (May, 1891), and in a banana plantation in Buginda at Chef Oransi, district of Andetei, west of the Semliki-Issango (December 18, 1891). This species is easily recognized by its peculiar coloration. It is furnished with a row of dark-brown spots close below the suture and a broad dark-brown band around the umbilicus, while the space

between is uniformly straw-yellow. The columella is usually dull purplish. Dr. le Roi obtained a magnificent set of twenty-seven examples at Thombe, Bahr el Djebel (March 20, 1910), and a single specimen at Gemesa, Bahr el Djebel (March 18, 1910). While G. Rohlf's specimen, according to Kobelt, measures only 38 mm., O. Neumann's specimens had a length of 60 to 65 mm. (Stuhlmann's examples were young). Dr. le Roi's specimens vary from 38 to 50 mm.; they, therefore, nearly approach Rohlf's shell.

LIMICOLARIA CONNECTENS, v. Mart.

This species was described by E. von Martens from a specimen obtained by O. Neumann (Nachrichtsblatt Deutsch. Malakozool. Gesell., 1895, p. 183; Martens, *Beschalte Weichtiere Deutsch-Ost-Afrikas*, Berlin, 1897, p. 112, pl. v, figs. 5-6). The following localities are enumerated by von Martens: Mhugu, on the north-east shore of Victoria Nyanza (O. Neumann, February, 1894), Karevia, western foot of Runssoro (Stuhlmann, February 16, 1891), and Bundeko, 0° 55' (Stuhlmann, July 4, 1891). Eighty specimens of this rare *Limicolaria* were taken by Dr. le Roi at Thombe, Bahr el Djebel (March 20, 1910), and two specimens at the Bahr el Ghazal (February 27, 1910). They fully agree with E. von Martens' description and figures, and are easily distinguished from *L. rectistrigata*, E. A. Smith, by their browner colour and stronger granulation. In many specimens the stripes of the last whorl possess a forwardly pointed emargination in the line which continues the suture. E. von Martens has already mentioned this.

LIMICOLARIA LEROI, n.sp.

Testa perforata, solida, oblongo-turrita, superne cæruleo-albida, infra flavo-albida, fusco-nigrescens flammulata; apex albus. Anfractus 8, plani, regulariter acerescentes, sutura plana separati, sub sutura tenne plicati, in anfractu ultimo et præcedentibus linea impressa marginata; ultimus paulum convexiusculus, fere $\frac{2}{3}$ longitudinis totius æquans. Apertura cæruleo-albida, pictura translucente, angusta, verticalis; peristoma simplex, acutum; columella cærulea; margo columellaris reflexus, cum margine basali angulum formans. Long. 37.5, diam. 16 mm.; apertura, alt. 16, lat. 7 mm.

Hab.—Bahr el Ghazal (Otto le Roi, February 23, 1910; Museum Al. Koenig).

Shell perforate, solid, oblong turreted, upper whorls bluish white, lower whorls yellowish white, flammulated with dark blackish brown; apex white. Whorls 8, rather flat, regularly increasing in size, separated by an almost flat suture, beneath which a fine plication is to be seen, bordered by an impressed line upon the last and preceding volutions; the last whorl somewhat convex, measuring about $\frac{2}{3}$ the length of the shell. Aperture bluish within, displaying the external striping, narrow, vertical; peristome simple, acute, the margin of the blue columella reflexed, forming an angle with the basal margin.

This species somewhat resembles the shell described by Preston (Proc. Malac. Soc. London, vol. vii, pp. 89-90, 1907) as *Limicolaria Smithi*,¹ from Uganda, but is distinguished by its flatter whorls, by more distinct markings, and by the impressed line, which borders the fine plication beneath the suture. It also somewhat resembles *L. Martensiana*, E. A. Smith, but is distinguished from it by its rich



dark blackish-brown markings, which are more intense. The angle which the margin of the columella forms with the basal margin is better marked in *L. Leroyi* than in *L. Martensiana*. We have pleasure in connecting with this handsome species the name of its collector, Dr. Otto le Roi. Unfortunately only one specimen is at hand, which was found at the Bahr el Ghazal (February 23, 1910).

LIMICOLARIA HEUGLINI, v. Mart.

This species was based by von Martens on two shells, collected by J. Heuglin in Southern Abyssinia (Malak. Blätt., 1866, pp. 94-5). Since that time specimens of this shell have been brought to Europe rather frequently, and a number of sub-species in North-East Africa have been distinguished. Four specimens were taken by Dr. le Roi, one at the Bahr el Ghazal (February 27, 1910), one northward of Bor,

¹ *Limicolaria Smithi*, Preston, named in honour of E. A. Smith, is pre-occupied by *L. Smithi*, Pils., named after A. Donaldson Smith, which is a sub-species of *L. flammata*, Caill. (Man. Conch., ser. II, vol. xvi, p. 283, Philadelphia, 1904). Therefore, we propose the name *Limicolaria Prestoni*, nom. nov.

Bahr el Djebel (March 8, 1910), and two at Gemesa, Bahr el Djebel (March 9, 1910).

PHYSOPSIS AFRICANA, Krauss.

Physopsis Africana ranges from South Africa through Mozambique and Zanzibar to the Nile. Dr. le Roi obtained one specimen in the Bahr el Ghazal (February 25, 1910).

PHYSOPSIS DIDIERI, Rochebr. & Germ.

This rare species was described by Rochebrune & Germain (Bull. Mus. hist. nat., 1904, p. 142). It was collected by the members of the mission of Bourg de Bozas at Donfile, White Nile. Dr. le Roi obtained a fine living specimen in the Bahr el Ghazal (February 25, 1910). It is quite distinct from the preceding species, although found together.

PLANORBIS SUDANICUS, v. Mart.

In Dr. le Roi's material there are eight specimens, which represent different ages. They agree well with von Martens' description (Malak. Blätt., 1870, p. 35). The first figure of the shell is to be found in Pfeiffer's *Novitates Conchologicae*, vol. iv, pp. 23-4, pl. cxiv, figs. 6-9. Dr. le Roi's specimens are from the Bahr el Ghazal (February 28, 1910).

SEGMENTINA ANGUSTA, Jick.

One specimen of this rare *Segmentina* was collected by le Roi in the Bahr el Ghazal (February 28, 1910). It agrees well with Jickeli's description and figure (Jickeli, *Fauna der Land- und Süsswasser-Mollusken Nord-Ost-Afrika's*, Dresden, 1874, p. 220, pl. vii, fig. 24).

CLEOPATRA BULIMOIDES (Oliv).

Dr. le Roi collected one specimen of this common species at Dakke, Nubia (February 7, 1910).

PACHYLABRA OVATA (Oliv), var. KORDOFANA, Parr.

Three specimens of this variety of the widely distributed *Pachylabra ovata*, which is common in Kordofan, were taken by le Roi in the Bahr el Abiad.

PACHYLABRA WERNEI (Phil.).

Five magnificent specimens were collected by le Roi in the Bahr el Abiad together with the preceding species.

LANISTES BOLTENIANUS (Chemn.).

Six specimens of this *Lanistes*, which is common in the Nile Valley, were obtained by le Roi, one in the Bahr el Ghazal (February 24, 1910), one in the Bahr el Djebel at Kiro (March 17, 1910), one in the Bahr el Abiad at Abu Doleb (March 30, 1910), and three in the Bahr el Zeraf (March 24-8, 1910).

LANISTES (MELADOMUS) OVUM (Peters).

A magnificent set of six specimens of this *Lanistes*, which has a wide range in Africa, was obtained by le Roi. Three were collected in the Bahr el Ghazal (February 24, 1910), and three in the Bahr el Djebel near Malek (March 8, 1910).

CORBICULA CONSOBRIANA (Caill.).

One specimen and a single valve of this *Corbicula* were obtained by le Roi in the Bahr el Abiad near the island of Lakadavia (February 17, 1910).

CORBICULA RADIATA (Phil.).

Dr. le Roi collected a single specimen of this species at Abu Simbel, Nubia (February 9, 1910).

CÆLATURA NILOTICA (Caill.), var. SENNAARIENSIS, Küst.

One specimen of this beautiful little shell was found by le Roi in the Bahr el Abiad near the Djebel Achmed Aga (April 3, 1910).

MUTELA NILOTICA, Sow.

We have before us one specimen of this *Mutela* which was taken by le Roi in the Bahr el Abiad near the island of Lakadavia (February 17, 1910).

SPATHA MARNOI, Jick.

Dr. le Roi obtained a fine specimen of this bivalve, the type of which was collected by Jickeli (Jickeli, *Fauna der Land- und Süßwasser-Mollusken Nord-Ost-Afrika's*, p. 264, pl. viii, fig. 3, Dresden, 1874) in the Bahr el Seraf (Marno) in the country of the Nuir, where Dr. le Roi also found his specimen (March 24-8, 1910).

ÆTHERIA CAILLAUDI, Fér.

One perfect specimen and a single valve were taken by le Roi in the Bahr el Abiad near the island of Lakadavia (February 17, 1910).